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Attached is the presentation distributed at that meeting. The information submitted and matters discussed have been previously submitted in the record in this proceeding. Any questions regarding this matter should be directed to the undersigned.

Very truly yours,

Catherine Wang

cc: Dr. Tom Stanley
Mr. David Siddall

THE TIA PLAN COMPARED TO THE ALCATEL PLAN

THE BASIC DIFFERENCES BETWEEN THE TWO PLANS

TIA PLAN			
Bandwidth (MHz)	Typical Utilization	Efficiency B/Hz	Modulation Required
2.50	4 x DS1	2.47	16 QAM
3.75	8 x DS1	3.29	32 QAM
30.00	3 x DS3	4.47	64 QAM

ALCATEL PLAN			
Bandwidth (MHz)	Typical Utilization	Efficiency B/Hz	Modulation Required
1.60	4 x DS1	3.86	64 QAM
3.20	8 x DS1	3.86	64 QAM
30.00	2 x DS3	2.98	16 QAM

The basic differences between the TIA Plan and the Alcatel Plan are the channel bandwidths required for 4 and 8 DS1 radios and their respective spectral efficiencies and the spectral efficiency required for 30 MHz radios.

The TIA Plan can accomodate Alcatel's Plan.

Alcatel's 1.6 MHz plan will fit into the 2.5 MHz TIA Plan and, likewise, for the 3.2 MHz radios fitting into the 3.75 MHz channel.

All manufacturers of 30 MHz radios, including Alcatel, meet the efficiency standard in the TIA Plan. These radios have been in production for several years.

WE BELIEVE THE TIA PLAN IS IN THE PUBLIC'S BEST INTEREST

THE TIA PLAN SERVES THE PUBLIC'S BEST INTEREST

USER BENEFITS OF THE TIA PLAN

- BETTER PATH RELIABILITY
- LOWER COST SYSTEMS
- BROADER SELECTION OF EQUIPMENT
- WIDER CHOICE OF SUPPLIERS
- [illegible]

USERS CAN ACHIEVE 25 % BETTER PATH RELIABILITY WITH THE TIA PLAN

THERE IS 400% MORE DOWNTIME WITH THE ALCATEL PLAN

TIA PLAN		
16 QAM/2.5 MHz		
% UPTIME	% DOWNTIME	SEC/YR DOWN TIME
99.9900%	0.0100%	3,154
99.9990%	0.0010%	315
99.9999%	0.0001%	32

ALCATEL PLAN		
64 QAM/1.6 MHz		
SEC/YR DOWN TIME	% DOWNTIME	% UPTIME
12,614	0.0400%	99.9600%
1,261	0.0040%	99.9960%
126	0.0004%	99.9996%

Assumptions		
6 GHz	Frequency	6 GHz
Independent	Distance	Independent
4 DS1	Capacity	4 DS1
30 dBm	Transmit Power	30 dBm
-97 dBm	Threshold (10e-6)	-91 dBm
117 dB	System Gain	111 dB
Independent	Antenna	Independent

USER COST WILL BE LOWER UNDER THE TIA PLAN

COMPARED TO THE ALCATEL PLAN GIVEN THE SAME PATH RELIABILITY

ANTENNA SIZE CHANGE REQUIRED to COMPENSATE* (at 6 GHz)	COST SAVINGS In ANTENNA SIZES (Both Ends) (Standard Performance)	COST SAVINGS In ANTENNA SIZES (Both Ends) (High Performance)
6 ft. to 10 ft.	$5,080	$8,000
8 ft. to 12 ft.	$9,840	$12,480
10 ft. to 15 ft.	$29,120	$26,400

* Larger antennas are required in order for a 64 QAM radio (Alcatel Plan) at 4 DS1s to make up a 6 dB difference in system gain over a 16 QAM radio (TIA Plan).

ADDITIONAL COST SAVINGS ACCRUE TO THE USER UNDER THE TIA PLAN:

Less Costly Radios - 16 QAM radios cost less than a 64 QAM radios;
No Tower Stiffening Required - to handle smaller antenna;
No Repeaters Required - for paths requiring 12 and 15 foot antennas.
Cost savings vary on a case by case basis, but could range from $6,000 to over a $200,000 if a repeater is required.

EQUIPMENT AVAILABILITY OF THE 4/8 DS1 RADIOS

USERS WOULD HAVE A BROADER SELECTION OF EQUIPMENT AND A WIDER CHOICE OF SUPPLIERS UNDER THE TIA PLAN

FREQ. BAND	BAND-WIDTH (MHZ)	TYPICAL UTILIZATION	VF CAPACITY	ALCATEL NETWORK SYSTEMS	DIGITAL MICROWAVE CORPORATION	HARRIS CORP. FARINON DIVISION	NORTHERN TELECOM CORPORATION	TELESCIENCES TRANSMISSION SYSTEMS, INC.
TIA PLAN								
6 GHz LOWER	3.75	8-DS1	192	MDR-5206	TBD			TELESTAR 6G/8DS1
	2.50	4-DS1	96	MDR-5306	TBD			TBD
6 GHz UPPER	3.75	8-DS1	192	MDR-5206	TBD			TELESTAR 6G/8DS1
	2.50	4-DS1	96	MDR-5306	TBD			TBD
10 GHz	3.75	8-DS1	192		QUANTUM 10	DVM 10-8T		TELESTAR 10G/8DS1
	2.50	4-DS1	96		10M-SE	Urbanet 10sc		TELESTAR 10G/4DS1
ALCATEL PLAN								
6 GHz Lower	3.20	8-DS1	192	MDR-5206				
	1.60	4-DS1	96	MDR-5306				
6 GHz UPPER	3.20	8-DS1	192	MDR-5206				
	1.60	4-DS1	96	MDR-5306				
10 GHz*	3.20	8-DS1	192					
	1.60	4-DS1	96					

*See Figure 15
TBD = To Be Developed in the next six to twelve months.

USERS' 2 GHz EQUIPMENT BEING DISPLACED FOR EMERGING TECHNOLOGIES

CURRENT PRODUCTS BEING OFFERED IN THE MARKET PLACE TODAY

FREQ. BAND	BAND-WIDTH	TYPICAL UTILIZATION	VF CAPACITY	ALCATEL NETWORK SYSTEMS	DIGITAL MICROWAVE CORPORATION	HARRIS CORP. FARINON DIVISION	NORTHERN TELECOM CORPORATION	TELESCIENCES TRANSMISSION SYSTEMS, INC.
2 GHz P 94 Analog	10 MHz	600 CH	600			FAS 2000e		STARPOINT 2000
	5 MHz	120 CH	120			FAS 2000e		STARPOINT 2000
	1.6 MHz	96 CH	96			LR4-2000		STARPOINT
	0.8 MHZ	48 CH	48			LR4-2000		STARPOINT
Digital	10 MHz	1-DS3	672	MDR-4102		DVM2-45		
	5 MHz	12-DS1	288	MDR-5402				TELESTAR 2G/8DS1

USERS' WOULD HAVE A MIGRATION PLAN THAT WOULD ALLOW THEM TO REUSE 2 GHz MODEMS UNDER THE TIA PLAN

FREQ. BAND	% OF 1992 LICENSING	CURRENT CHANNELS	TYPICAL UTILIZATION	NEW CHANNELS	TYPICAL UTILIZATION
2 GHz P 94 Analog	6.6%	10 MHz	600 CH	10 MHz	600 CH
	0.5%	5 MHz	120 CH	5 MHz	120 CH
	8.6%	1.6 MHz	96 CH	2.5 MHz	96 CH
	6.2%	0.8 MHZ	48 CH	1.25 MHz	48 CH
Digital	0.4%	10 MHz	1-DS3	10 MHz	1-DS3
	0.0%	5 MHz	12-DS1	5 MHz	12-DS1
P 21	77.7%	3.5 MHz	12-DS1	3.75/5.0 MHz	12-DS1
		3.5/3.2 MHz*	8-DS1	3.75 MHz	8-DS1
		3.5/1.6 MHz*	4-DS1	3.75/2.5 MHz	8/4-DS1

ALCATEL EQUIPMENT IS ACCOMMODATED UNDER THE TIA PLAN

*** The FCC authorized bandwidth is 3.5 MHz. It is unknown why Alcatel does not offer 3.5 MHz radios for these capacities. Alcatel does offer a 3.5 MHz 12 DS1 radio. (See Figure 6)**

THE TIA PLAN FOR CHANNEL BANDWIDTHS AND EFFICIENCY ARE DERIVED FROM THE LOWER 6 GHz AND 10 GHz BANDS

		Current FCC Rules **		TIA Proposed Rules		
N	Bandwidth (Mhz)	VF Channels	Equivalent DS1	VF Channels	Equivalent DS1	Efficiency (B/Hz)
1	30.00	1152	48	2016	84	4.47
2	15.00	576	24	n/a	n/a	n/a
3	10.00	384	16	672	28	4.47
6	5.00*	192	8	288	12	3.70
8	3.75*	144	6	192	8	3.29
12	2.50*	96	4	96	4	2.47
24	1.25*	48	2	48	2	2.47

The TIA Plan basically is stating that the more spectrum you use the more efficiently it must be used.

The 10 GHz Band is currently the only band in use today above 2 GHz with a narrow band channel plan. It has been used as an alternate band for 2 GHz users when 2 GHz spectrum is not available due to frequency congestion. The 10 GHz band has been fulfilling these user needs now for several years.

* Under 10 GHz Band

**Under 6 GHz Common Carrier Rules

2.5 MHz CHANNEL PLANS RECOMMENDED BY CCIR

USERS CAN EXPAND THEIR SYSTEMS IN THE SAME BE BANDWIDTH

SPECTRAL EFFICIENCY OF THE 4/8 DS1 RADIOS

- **USERS CAN MAKE MORE EFFICIENT USE OF THE SPECTRUM UNDER THE TIA PLAN**

BAND-WIDTH (MHz)	MINIMUM UTILIZATION per RADIO (DS1)	TOTAL UTILIZATION IN 30 MHz (DS1)	MAXIMUM UTILIZATION per RADIO (DS1)	TOTAL UTILIZATION IN 30 MHz (DS1)
TIA PLAN				
2.50	4	48	8	96
3.75	8	64	12	96
ALCATEL PLAN				
1.60	4	72	4	72
3.20*	8	48	8	48

* Occupies 5 MHz

ONLY THE TIA PLAN OFFERS THE USERS THE FLEXIBILITY TO GROW IN THE SAME RF BANDWIDTH

BEFORE GROWTH	TIA Plan	Alcatel Plan
Typical Utilization	4 DS1	4 DS1
Occupied Bandwidth	2.5 MHz	1.6 MHz
Spectral Efficiency	2.47 b/Hz	3.86 b/Hz
Typical Modulation Required	16 QAM	64 QAM
AFTER GROWTH		
Growth Utilization	8 DS1	8 DS1
Occupied Bandwidth	2.5 MHz	1.6 MHz
Spectral Efficiency	4.94 b/Hz	7.72 b/Hz
Typical Modulation Required	128 QAM*	512 QAM**

* 128 QAM and 256 QAM radios are commonly used today. TeleSciences and Alcatel already supply radios with this type of spectral efficiency.

** 512 QAM modulation is not a proven technology for narrow band radios.

ALCATEL'S CHANNEL PLAN IN REALITY IS ONLY A 5 AND 30 MHz PLAN

5 AND 30 MHz CHANNELS ARE ALWAYS USED FOR GROWTH

THIS MAKES ALCATEL'S PLAN SPECTRALLY INEFFICIENT

Typical Utilization	**4 DS1****	**1 DS3**
Occupied Bandwidth	**1.6 MHZ**	**10 MHz**
Occupied bandwidth spectral efficiency	**3.86 b/Hz**	**4.47 b/Hz**
Spectrum reserved for growth*	**5.0 MHZ**	**30 MHz**
True spectral efficiency	**1.24 b/Hz**	**1.44 b/Hz**

*** User's block out this much spectrum with frequency coordination houses, therefore preventing other users from using the spectrum.**

The joint commenters' are opposed to growth by blocking frequencies. Growth can be achieved by higher order modulation as seen in Figure 10.

**** The Alcatel plan does not provide a growth plan for an 8 DS1 user occupying 3.2 MHz of bandwidth.**

CURRENT EQUIPMENT THAT BECOMES OBSOLETE UNDER BOTH PLANS

THE INDUSTRY NEEDS 5 YEARS BEFORE OBSOLETING THESE RADIOS

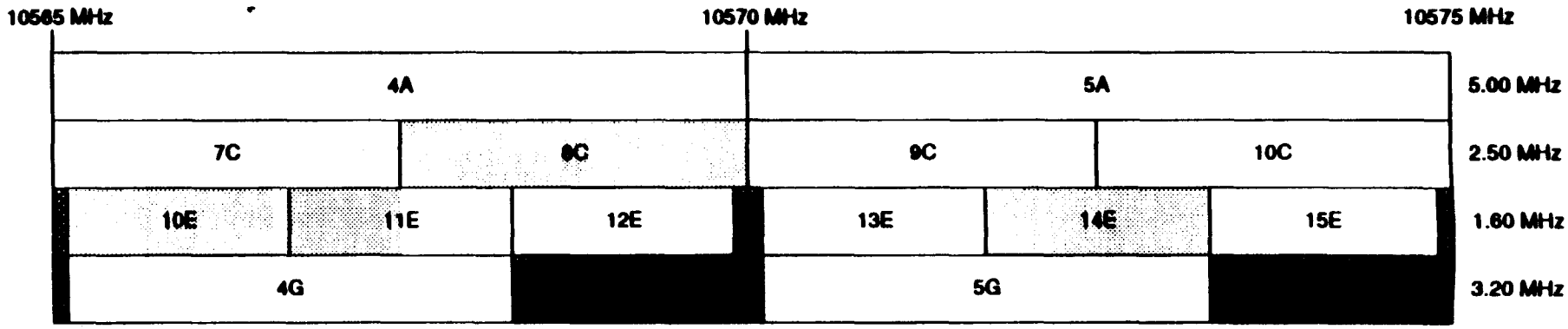
FREQ. BAND	BAND-WIDTH	TYPICAL UTILIZATION	VF CAPACITY	ALCATEL NETWORK SYSTEMS	DIGITAL MICROWAVE CORPORATION	HARRIS CORP. FARINON DIVISION	NORTHERN TELECOM CORPORATION	TELESCIENCES TRANSMISSION SYSTEMS, INC.
6 GHz LOWER	30 MHz	2-DS3	1344	MDR-4206		DM 6 -90		
	15 MHz	1-DS3	672		QUANTUM 6			
	10 MHz	16-DS1	384		QUANTUM 6			
	5 MHz	8-DS1	192		QUANTUM 6	DVM6-8T		TELESTAR 6G/8DS1
	3.75 MHz	4-DS1	96					TELESTAR 6G/4DS1
6 GHz UPPER Digital	10 MHz	16-DS1	384	DTR-26	QUANTUM 6			
	5 MHz	8-DS1	192	DTR-13	QUANTUM 6	DVM6-8T		TELESTAR 6G/8DS1
	5 MHz	4-DS1	192					TELESTAR 6G/4DS1
11 GHz	30 MHz	2-DS3	1344	MDR-4211		DM 11-90		
	15 MHz	1-DS3	672	MDR-4111A	QUANTUM 11	DM 11-45		
	10 MHz	16-DS1	672		QUANTUM 11			
	10 MHz	12-DS1	384	MDR-5111				
	5 MHz	8-DS1	192		QUANTUM 11			

It takes approximately $3 Million and 2 years just to develop one frequency band.

Most of these products were recently developed and first shipments are occurring in 1993.

It would be an economic hardship for manufacturers if they could not get an ROI on these products.

ALCATEL'S 10 GHz CHANNEL PLAN IS SPECTRALLY INEFFICIENT and IMPRACTICAL*



The use of channel 10E and 8C would leave 800 KHz of spectrum at channel 11E fallow.

The use of channel 14E would preclude the use of channels 9C and 10C.

The Alcatel plan would only allow 13 pairs of 8 DS1 channels as compared to 17 pairs under the TIA plan.

The TIA plan for 2.5 MHz will not meet the spectral efficiency of 3.86 B/Hz as required under the Alcatel plan.

There is no provision for the additional use of 3.75 MHz channels into the old point-to-multipoint part of the band.

For these reasons the Alcatel plan effectively eliminates the use of the TIA channel plan.

See Appendix C, Figure D for the TIA 10 GHz recommended channel plan.

* Only a portion of the 10 GHz band is shown for illustration.

TIA Recommended Rules

Bandwidth (MHz)	Typical Utilization	Equivalent VF Channels	Efficiency (B/Hz)	Initial Loading
40.00	4 DS3	2688	4.47	50%
30.00	3 DS3	2016	4.47	50%
20.00	2 DS3	1344	4.47	50%
10.00	1 DS3	672	4.47	n/a
5.00*	12 DS1	288	3.70	n/a
3.75*	8 DS1	192	3.29	n/a
2.50*	4 DS1	96	2.47	n/a
1.25*	2 DS1	48	2.47	n/a

All authorized bandwidths are defined.

The greater the bandwidth the better the spectrum efficiency (B/Hz).

Initial loading is for the first year.